WDNR & EPA R5, 3-7-2018

Topics:

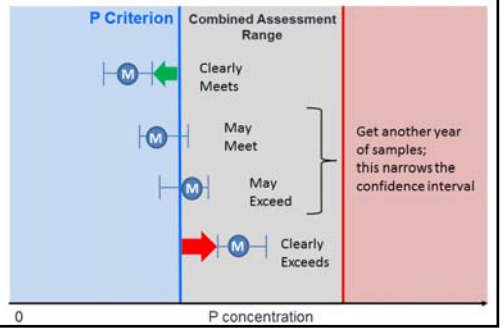
1. Confidence intervals & assessments
   - How are CI used in listing & delisting?
2. Using Phosphorus Response Indicators for Combined Assessments of P
   - How would P & PRI be used in TMDLs?
3. Using "weather-controlled ambient P conc." for setting certain site-specific P criteria

Using Confidence Intervals (CI) for Assessments

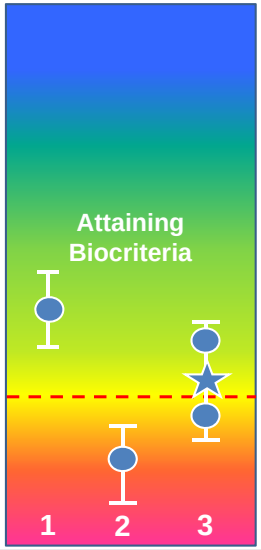
- 102 Subch. IV (Waterbody Assessments) describes two ways to apply CI (NR 102.52(2))
  - For concentrations or frequencies (TP, chl a)
    - Around multiple values
  - For taxonomic group of organisms (IBIs)
    - Around a single value

Using CI for concentrations (TP, chl a)

- Using an 80% two-sided CI around the samples gives us 90% certainty the true median/mean is above/below criterion
- Compare the confidence interval to the criterion
  - Clearly meets
  - Clearly exceeds
  - Collect more data (to a point)



Using CI around a single IBI score



- Use CI to determine when you need more samples for an attainment decision
- CI is determined using a bootstrapping method

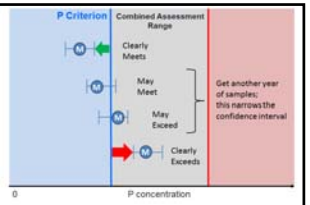
Individual Sample
Site Mean

Case 1: Clearly attaining Biocriterion

Case 2: Clearly not attaining Biocriterion

Case 3: Straddles criterion: Take another sample & compare the sample mean to the criterion
→ Result: Attaining Biocriterion

How are CIs used for delisting?



- Using new assessment data, if the CI is "Clearly Attaining" the criterion, it would be delisted
  - If you get a result that is not "Clear", sample another year
  - If the result is still not "Clear" but the mean/median is "attaining" the criterion, confirm with biologist that delisting is appropriate

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Phosphorus Response Indicators (PRI) let us know whether a waterbody is impacted by P

	Algae Abundance	Community metrics
Lakes:	Chlorophyll a	Plants
Rivers:	Chlorophyll a	Bugs
Streams:	Attached algae	Diatoms

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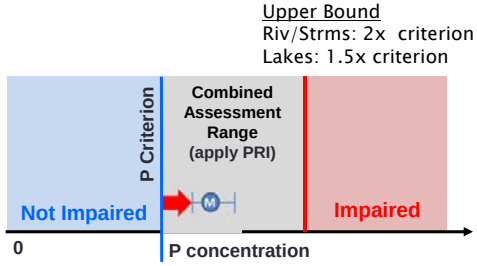
Confirming P impacts using P Response Indicators

- If waterbody exceeds P criteria, use biology (PRI) to confirm whether there's an impairment before listing
  - Also use PRI to determine eligibility for site-specific criteria



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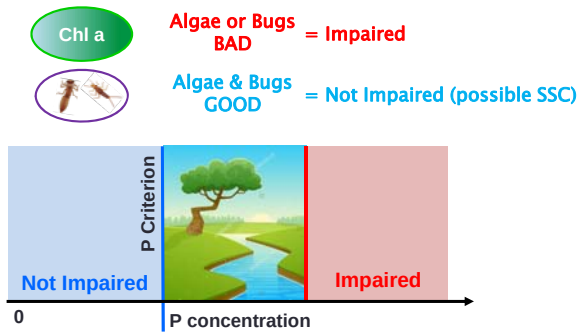
Confirming P impacts using P Response Indicators

- Example:



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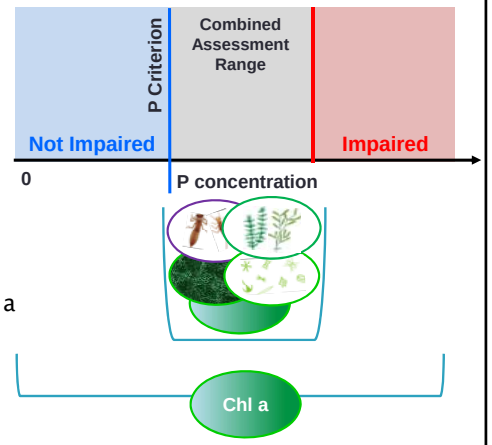
- Apply PRI only within Combined Assessment Range **AND**
- Apply chlorophyll as a stand-alone metric for all lakes & rivers



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How are combined assessments used for delisting?

- If P still exceeds (within range) but the PRI are attaining, the water would be delisted for P
  - If P is in "overwhelming exceedance" (red) range, it remains listed for P
- It could be a potential candidate for a less-stringent SSC

How many waters would be delisted by applying PRI?

- Removes a small number of waters from impaired list
  - 6 streams, 10 lakes (based on ~900 sites with existing info; ~2%)
  - Others may be eligible with more data
- Keeps some new waters from being added
  - Each year we sample ~200 stream sites for P
  - May find 3-4 sites per year that would be kept off the list

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How do PRI fit with TMDLs?

- Are TMDL goals based just on P or also on PRI?
  - We expect just on P
- To tell if you've attained the TMDL goal, do you use only P or also PRI?
  - Achieving the TMDL goal is based on attaining the P criterion
  - If it didn't attain the P criterion but it did attain the PRI:
    - Waters would be delisted for P (that wouldn't affect permit limits)
    - Could do an SSC so that it would also attain P
- If a water in a TMDL area is delisted for P based on PRI, does that affect a discharger's limits?
  - No, being delisted doesn't affect the permit limits

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Less-stringent SSC

1. Exceeds P but biological metrics are attained

Example:
- Statewide P criterion: 75 ug/L
  - Current P conc. is 110 ug/L → Exceeds P
- Biology: All metrics attained
  - → In receiving water & downstream waters
  - → Current P levels are protective of Designated Uses
- Process: Set SSC at the "weather-controlled current ambient P concentration"…

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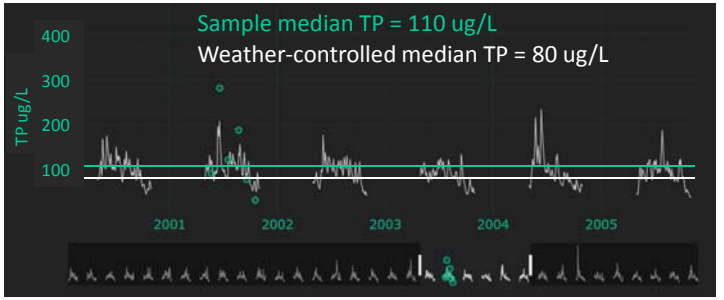
Weather-Controlled Ambient P Conc.

- Pratt Creek Tributary near Juneau WI



- If we set an SSC based on the weather controlled median conc, then for future assessments we would use updated data to re-calculate the weather controlled conc. & compare it to the criterion (the SSC).

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